

1           1. A scanning exposure apparatus in which a substrate  
2 is exposed by synchronously moving a mask and the substrate,  
3 the apparatus comprising:

4           a beam source which emits pulses of an exposure beam  
5 in response to trigger signals output at predetermined time  
6 intervals;

7           a projection system disposed in a path of the exposure  
8 beam from the beam source and which projects an image of a  
9 pattern formed on the mask onto the substrate, the mask to  
10 be disposed on one side of the projection system and the  
11 substrate to be disposed on another side thereof;

12           a stage disposed on the one side or the other side of  
13 the projection system and which is movable in a scanning  
14 direction while holding the mask or the substrate,  
15 respectively; and

16           a interferometer operatively connected to the stage  
17 and which outputs a measurement value corresponding to  
18 positional information of the stage in the scanning  
19 direction;

20           wherein a start timing of the output of the trigger  
21 signals is controlled based on the measurement value from  
22 the interferometer.

1           2. A scanning exposure apparatus in which a substrate  
2 is exposed by synchronously moving a mask and the substrate,  
3 the apparatus comprising:

4           a beam source which emits pulses of an exposure beam  
5 in response to trigger signals output at predetermined time  
6 intervals;

7           a projection system disposed in a path of the exposure  
8 beam from the beam source and which projects an image of a  
9 pattern formed on the mask onto the substrate, the mask to  
10 be disposed on one side of the projection system and the  
11 substrate to be disposed on another side thereof;

12           a stage disposed on the one side or the other side of  
13 the projection system and which is movable in a scanning  
14 direction while holding the mask or the substrate,  
15 respectively; and

16           a interferometer operatively connected to the stage  
17 and which outputs a measurement value corresponding to  
18 positional information of the stage in the scanning  
19 direction;

20           wherein a stop timing of the output of the trigger  
21 signals is controlled based on the measurement value from  
22 the interferometer.

1           3. A scanning exposure method in which a substrate is  
2 exposed by synchronously moving a mask and the substrate,  
3 the method comprising:

4           emitting pulses of an exposure beam from a beam source  
5 in response to trigger signals output at predetermined time  
6 intervals;

7           moving a stage which holds the mask or the substrate  
8 in a scanning direction;

9           measuring positional information of the stage in the  
10 scanning direction using an interferometer which outputs a  
11 measurement value corresponding to the positional  
12 information of the stage; and

13           determining a start timing of the output of the  
14 trigger signals based on the measurement value from the  
15 interferometer.

1           4. A scanning exposure method according to claim 3,  
2 wherein the beam source emits the pulses of the exposure  
3 beam at a rated maximum frequency.

1           5. A scanning exposure method according to claim 4,  
2 further comprising:

3           adjusting a scanning speed of the stage in order to  
4   supply the substrate with a target exposure amount.

1           6. A scanning exposure method according to claim 4,  
2   further comprising:

3           adjusting intensity of the pulses in order to supply  
4   the substrate with a target exposure amount.

1           7. A scanning exposure method according to claim 4,  
2   further comprising:

3           adjusting a width in the scanning direction of an  
4   illumination area to which the pulses are directed, in order  
5   to supply the substrate with a target exposure amount.

1           8. A scanning exposure method in which a substrate is  
2   exposed by synchronously moving a mask and the substrate,  
3   the method comprising:

4           emitting pulses of an exposure beam in response to  
5   trigger signals output at predetermined time intervals;

6           moving a stage which holds the mask or the substrate  
7   in a scanning direction;

8           measuring positional information of the stage in the  
9   scanning direction using an interferometer which outputs a

10 measurement value corresponding to the positional  
11 information of the stage; and  
12 determining a stop timing of the output of the trigger  
13 signals based on the measurement value from the  
14 interferometer.

1 9. A scanning exposure method according to claim 8,  
2 wherein the beam source emits the pulses of the exposure  
3 beam at a rated maximum frequency.

1 10. A scanning exposure method according to claim 8,  
2 further comprising:  
3 adjusting a scanning speed of the stage in order to  
4 supply the substrate with a target exposure amount.

1 11. A scanning exposure method according to claim 8,  
2 further comprising:  
3 adjusting intensity of the pulses in order to supply  
4 the substrate with a target exposure amount.

1 12. A scanning exposure method according to claim 8,  
2 further comprising:  
3 adjusting a width in the scanning direction of an

4 illumination area to which the pulses are directed, in order  
5 to supply the substrate with a target exposure amount.

1 13. A laser apparatus used with a scanning exposure  
2 system in which a mask and a substrate are moved during  
3 scanning exposure of the substrate, the laser apparatus  
4 comprising:

5 a beam source which emits pulses of an exposure beam  
6 in response to trigger signals output at predetermined time  
7 intervals; and

8 wherein a start timing of the output of the trigger  
9 signals is controlled based on a measurement value from an  
10 interferometer which measures positional information of the  
11 mask or the substrate.

1 14. A laser apparatus used with a scanning exposure  
2 system in which a mask and a substrate are moved during  
3 scanning exposure of the substrate, the laser apparatus  
4 comprising:

5 a beam source which emits pulses of an exposure beam  
6 in response to trigger signals output at predetermined time  
7 intervals; and

8 wherein a stop timing of the output of the trigger

9 signals is controlled based on a measurement value from an  
10 interferometer which measures positional information of the  
11 mask or the substrate.

1 15. A device manufacturing method including scanning  
2 exposure process in which a substrate is exposed by  
3 synchronously moving a mask and the substrate, the method  
4 comprising:

5 emitting pulses of an exposure beam from a beam source  
6 in response to trigger signals output at predetermined time  
7 intervals;

8 moving a stage which holds the mask or the substrate  
9 in a scanning direction;

10 measuring positional information of the stage in the  
11 scanning direction using an interferometer which outputs a  
12 measurement value corresponding to the positional  
13 information of the stage; and

14 determining a start timing of the output of the  
15 trigger signals based on the measurement value from the  
16 interferometer.

1 16. A device manufacturing method including scanning  
2 exposure process in which a substrate is exposed by

3 synchronously moving a mask and the substrate, the method  
4 comprising:  
5 emitting pulses of an exposure beam from a beam source  
6 in response to trigger signals output at predetermined time  
7 intervals;  
8 moving a stage which holds the mask or the substrate  
9 in a scanning direction;  
10 measuring positional information of the stage in the  
11 scanning direction using an interferometer which outputs a  
12 measurement value corresponding to the positional  
13 information of the stage; and  
14 determining a stop timing of the output of the trigger  
15 signals based on the measurement value from the  
16 interferometer.